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COMPARATIVE COST ECONOMICS OF THE EFFECT OF DRIP FERTIGATION ON CHILLIES AMONG DIFFERENT FERTIGATION EQUIPMENT

B. GOWTHAM SINGH[1] & G. RAKESH[2]

[1]*Teaching Associate, Dr. Y. S. R Horticultural University, Parvathipuram, Andhra Pradesh, India*

[2]*Research Associate, Dr. Y. S. R Horticultural University, Venkataramannagudem, Andhra Pradesh, India*

ABSTRACT

An attempt has been made to compare the economics of cost of production in chilli, for drip fertigation and conventional fertigation was carried out, at field irrigation laboratory of department of Soil and Water Engineering, College of Agricultural Engineering, Bapatla during rabi 2015-16. Though the initial capital investment was high in drip irrigation system, the cumulative benefit would be greater and considering the longer life of the system. The benefit cost ratio of chillies were analyzed by calculating the annual cost, cost of cultivation, seasonal total cost, yield produced, selling price, income from produce. Highest income from produce was recorded for the treatment T1 (Rs.157650.00), followed by the treatment T2 (Rs.150450.00) whereas T3 recorded (Rs.122850.00). The lowest net seasonal income was recorded for the treatment T4 (Rs.89100.00) was estimated by multiplying the total production of chillies value with prevailing market rate.

KEYWORDS: Economics of Cost, Cost of Cultivation & Market Rate

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INTRODUCTION

Chilli (*Capsicum annuum L.*) is an important spice cum vegetable crop of India. Chilli is believed to be originated in the tropical America and known from pre-historic times in Peru. Columbus carried chilli seeds to Spain in 1493. The cultivation of chilli and capsicum spread rapidly from Spain to Europe (Raju and Luckose, 1991). Among, all varieties of chilli, some varieties are famous for red colour, because of the pigment 'capsanthin' and others are known for biting pungency attributed to 'capsaicin'. India is the only country which is rich in many varieties with different quality factors. Chillies are rich in vitamins, especially in vitamins A and C. Fertilizers applied under traditional methods are generally not utilized efficiently by the crop. In fertigation by drip system, nutrients are applied through emitters directly into the zone of maximum root activity and consequently fertilizer-use efficiency can be improved over conventional method of fertilizer application. Fertigation, a latest technology wherein, nutrients are applied along with the irrigation water and opens new possibilities for controlling water and nutrient supplies to crops. In India, area under chilli cultivation was 805.00 thousand hectare and 1276.00 MT production with 1.6 MT/ha productivity in year 2011-12 (Anon, 2011b). In Gujarat, area, production and productivity of green chilli were 43395 ha, 262011 MT and 6.04 MT/ha in year 2011-12, respectively (Anon, 2011a).

MATERIAL AND METHODS

The experiment was designed for the RBD with four main treatments with five replications. The four

main treatments T1, T2, T3 and T4 were fertigated with fertilizer injection pump, venturi injector, fertilizer tank and control respectively. The treatments are named as follows for convenience:

T1 -	Drip + Fertilizer injection pump
T2 -	Drip + Venturi injector
T3 -	Drip + Fertilizer tank
T4 -	Control

Economic analysis explains how prices are determined under conditions of competition or monopoly, why business fluctuations occur, and what force promotes or retard economic growth. The question whether business was run profitably or not determined by an analysis called economic analysis. The objective of economic analysis is to verify the use of various inputs of production and income incurred. The cost economics of drip system with different fertigation equipment were analyzed from the data collected, which includes the initial cost of the system components and costs of accessories. The expenditure incurred from field preparation to harvest, was worked out and expressed as Rs ha^{-1}. The green chilli yield was computed per hectare and the total income was worked out based on the prevailed minimum market rate of Rs.15.00 per kg. Net returns were obtained, by subtracting the cost of cultivation from gross return. The cost of drip system for one hectare was worked out, based on current market rates. The life of the drip system was assumed to be 6 years. Prevailing market price of drip components from a standard firm was used. Interest on capital investment was taken, as 8.0 % per annum. The benefit cost ratio (BCR) was worked out, by using the formula, suggested by Palaniappan (1985).

$$\text{BCR} = \frac{\text{Gross return (Rs ha}^{-1})}{\text{Total cost of cultivation (Rs ha}^{-1})}. \quad (3.9)$$

RESULTS AND DISCUSSIONS

The life span of drip system varies from 6 to 10 years depending upon quality and maintenance of drip system. Hence a normal life span of 6 years was considered for computation. Though the initial capital investment was high in drip irrigation system, the cumulative benefit would be greater and considering the longer life of the system.

The benefit cost ratio of chillies and maize crop were analyzed and shown in Table 1, by calculating the annual cost, cost of cultivation, seasonal total cost, yield produced, selling price, income from produce. From the Table 1, Highest income from produce was recorded for the treatment T1 (Rs.157650.00), followed by the treatment T2 (Rs.150450.00) whereas T3 recorded (Rs.122850.00). The lowest net seasonal income was recorded for the treatment T4 (Rs.89100.00) was estimated by multiplying the total production of chillies value, with prevailing market rate.

Benefit cost ratio (BCR) for chillies crop and depicts that, the different costs of production and economic returns of producing one hectare of chillies, under conventional as:

Table 1: Cost Economics of Chillies Crop in all Four Treatments

S. No	Particulars	T1	T2	T3	T4
1	Annual Cost (Rs ha^{-1}) of drip system (Depreciation, Interest, Repair & Maintenance)	18927	15280	15644	0
2	Cost of Cultivation (Rs ha^{-1}) (FYM, Seed, Fertilizers & Pesticides, including labour charges)	86659	86659	86659	82659
3	Seasonal total cost (1+2) Rs ha^{-1}	105586	101939	102303	82659
4	Yield produced (t ha^{-1})	10.51	10.03	8.19	5.94
5	Selling price (Rs t^{-1}) @ Rs 15 kg^{-1}	15000	15000	15000	15000

Table 1: Contd.,					
6	Income from produce (Rs) (4x5)	157650	150450	122850	89100
7	Benefit cost ratio (6/3)	1.49	1.47	1.20	1.08

Well as drip fertigation system, using fertilizer equipments. Total cost of production under fertilizer injection pump was high *i.e*. Rs.105586. This is because of installation cost of fertilizer injection pump. The results also revealed that BCR was again high for fertilizer injection pump treatment. BCR was calculated from incremental benefits and costs of fertilizer injection pump over conventional irrigation method of experimental site. It is evident from the table that BCR was the highest for the T1 of 1.49 and the lowest for the T4 of 1.08. Venturi injector occupied the second position for BCR of 1.47, whereas T3 recorded BCR as 1.20. Table 1 clearly indicates that, at different methods of fertilizer application results had significant difference.

After estimation of benefit cost ratio, it was finally concluded that, drip fertigation experiments was more profitable rather than traditional hand broadcasting method. From findings of the study, it was found that, fertilizer applied with fertilizer injection pump had absolute advantages, over traditional as well as venturi and fertilizer tank method of fertilizer application. Moreover, the analysis showed that fertilizer injection pump got priority, due to higher BCR over traditional irrigation system, rather than venturi injector system. The results are in line with results of Thiyagarajan *et al*. (2011).

CONCLUSIONS

The present study concluded that, for chillies crop cultivation the total annual cost for the drip fertigation system was Rs. 86, 659. The benefit cost ratio of 1.49 was recorded for T1, followed by T2 (1.47) and for T3 (1.20). The least value of benefit cost ratio was recorded in T4 as 1.08. On the basis of benefit cost ratio treatment T1 is recommended.

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